SHREYAS KAMATH KALASA MOHANDAS

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Artificial Intelligence (AI) | Computer Vision | Deep Learning (DL) | Machine Learning (ML) | Image Processing

- Computer vision and machine learning specialist with 8+ years of experience in academic and industry settings.
- Experienced with ML and DL practices in object detection, model compression, and image restoration and segmentation.
- Rich experience with 7+ years of coding with Python and deep learning frameworks, such as Pytorch and TensorFlow.
- Strategic thinker and collaborator with strong analytical, problem-solving and communication skills.

COMPUTER VISION, MACHINE LEARNING, AND DEEP LEARNING EXPERIENCE

SimpliSafe, Inc., Boston, MA (January 2022 – Present)

A home security and monitoring products -based company that specializes in security systems, cameras, video doorbells, and smart locks against intruders, fires, water damage, and medical emergencies.

Computer Vision Engineer – II (Computer Vision Analytics Team) (July 2023 – Present)

- Reduced False Positives attributed to rain, snow, and bugs by 90% by designing and developing novel motion detection algorithms to filter out fast-moving objects in edge systems.
- Implemented offline augmentation techniques that increased the dataset size by 3x to improve model training and performance.
- Developed tools for streamlining data collection and management pipelines for efficient deep learning model training.
- Explored methods for assessing image quality, devised setups to test various camera conditions, and evaluated object detection model performance to inform the selection of camera chips for next-generation devices.

Computer Vision Engineer – I (AI Research and Computer Vision Analytics Team) (January 2022 – July 2023)

- Designed, developed, and trained in-house YOLO object detection models to address gaps in surveillance systems.
- Developed cutting-edge model compression tools, achieving an impressive 50% drop in model compression and latency while maintaining a minimal decrease of only 0.8% in mean average precision (mAP).
- Improved model mAP by approximately 11% through data curation and novel augmentation techniques that emulate model inference behavior on edge devices.
- Collaborated with senior specialists to deliver insightful analytical AI solutions; mentored an intern on AI best practices, coding standards, and successful project execution.

American Science and Engineering, Billerica, MA (May 2019 – August 2019)

A security-based company that specializes in detection technology to help secure borders, ports, and high-threat facilities from threats and contraband.

Computer Vision & Deep Learning Intern

- Developed DL models to detect contraband in backscatter X-ray images, contributing to improved security measures.
- Created intuitive visualization tools to facilitate the interpretation of CNN architectures, aiding in the analysis and optimization of model performance.
- Conducted extensive research on GAN-based approaches to synthesize contraband images to enhance model training.

Tufts University, Medford, MA (September 2016 – January 2022)

A 10,000-student private, nonsectarian R1 research university

Graduate Research Assistant, Vision, and Sensing System Laboratory

- Focused on conducting research in computer vision, image processing, and artificial intelligence for developing applications to solve complex problems faced in multimedia, healthcare, dental, and biometric industries.
- Worked closely with multiple departments and stakeholders to manage decisions and to select analytical methodologies, including data acquisition and curation, associated costs and trade-offs, and developing prototypes.
- Successfully co-authored and secured $200K+ in grant funding from NIH and Tufts for AI/CV research projects.
- Designed and developed CNN models for object classification, detection, image restoration, and segmentation, including:
  - A thermal facial emotion recognition model with 96.2% accuracy on the Tufts Face database.
  - An ensemble model employing CNN and the XGBoost algorithm for tumor classification, achieving a 90% accuracy rate at the ISIC 2019 challenge.
  - An innovative CNN model with a unique loss function for single-image exposure correction, synthesizing multiple exposures to restore food images captured on smartphones.

- A Quaternion CNN framework with Distributed Systems compatibility to perform super-resolution that matched state-of-the-art quantitative metrics with 4x lower parameters and FLOPS.
- A novel CNN-based image segmentation system that outperformed outperforming state-of-the-art by 2% mIoU.

The University of Texas at San Antonio, San Antonio, TX (October 2015 – February 2016)

A 34,000-student state, nonsectarian R2 research university

Graduate Research Assistant, Department of Electrical and Computer Engineering

- Focused on research in 3-D and 2-D image processing space to alleviate problems faced in the biometric industry.
- Developed a feedback-based algorithm to enhance fingerprint images by utilizing a novel quality measure.
- Developed algorithms for fingerprint image enhancement, classification that obtained 86.2% accuracy with SVM, and authentication using RANSAC algorithm to match features detected using SIFT, SURF, and Hessian.

EDUCATION

Doctor of Philosophy in Electrical and Computer Engineering (Ph.D.) Feb 2022

Tufts University, School of Engineering (GPA - 3.93)

- Dissertation: Bio-Inspired Visual Data Analytic with Applications in Nutrition and Biometrics; Advisor: *Dr. Karen Panetta*

Master of Science in Electrical and Computer Engineering (MS) May 2016

The University of Texas at San Antonio (GPA - 3.96)

- Thesis: Fingerprint Image Quality Assessment, Verification, And Detection; Advisor: *Dr. Sos S Agaian*

TECHNICAL SKILLS

- **Skills:** Object detection, localization, and tracking, image segmentation, image depth estimation, 3-D reconstruction, 3-D volume estimation, CNN, Transformers, and basic knowledge of Gen AI.
- **Programming Languages:** Experienced in Python, MATLAB, and basic knowledge of C/C++, Bash
- **Software/Libraries:** Experienced in Pytorch, TensorFlow, Keras, Numpy, Pandas, OpenCV, Scikit-Learn, Matplotlib, and basic knowledge in GitHub, Singularity, and Docker
- **Public Cloud Platform:** AWS EC2 instances, HPC
- **Operating Systems:** Experienced in Windows 10, Linux, and basic knowledge of macOS.

PUBLICATIONS & PATENT

A representative sample of the most relevant articles from a total of 21 papers

Journals

- Deep Perceptual Image Enhancement Network for Exposure Restoration - IEEE Transactions on Cybernetics, 2022.
- FTNet: Feature Transverse Network for Thermal Image Semantic Segmentation - in IEEE Access, 2021.
- A comprehensive database for benchmarking imaging systems - IEEE Transactions on Pattern Analysis and Machine Intelligence, 2018.

Conferences

- QSRNet: Towards quaternion-based single image super-resolution - Multimodal Image Exploitation and Learning, SPIE, 2022.
- DTTNet: Deep Transverse Network for monocular depth estimation - Multimodal Image Exploitation and Learning SPIE, 2022.
- TERNet: A deep learning approach for thermal face emotion recognition - In Mobile Multimedia/Image Processing, Security, and Applications, SPIE, 2019

Patents

- System and Method for Multimedia Analytic Processing and Display. - U.S. Patent No. 11,450,087. 20 Sep. 2022.

AWARDS AND ACTIVITIES

- Awardee of Stern Endowed Graduate Research Fellowship for outstanding achievements and scholarly promise – 2020, 2021
- Reviewer- IEEE Open Access, IEEE Transactions on Systems, Man and Cybernetics: Systems, IEEE Symposium on Technologies for Homeland Security (HST '16), IEEE Open Access (2019, 2020), IEEE Transactions on Systems, Man, and Cybernetics: Systems (2018 - present), IEEE Transactions on Artificial Intelligence (2021 - present), MDPI (2022 - present)